OBJECT ORIENTED PROGRAMMING WITH JAVA 8– LAB 5

1.Create a class Student with rollno, name, age and totalmark as instance variables and methods get(), disp(), findgrade(). If total mark is greater than 900 grade A, greater than 700 grade B, greater than 500 grade C else failed. Create a subclass ProjectStudent from the Student class with the data members projid, projtitle, company, projgrade with methods getPDetails(), dispPDetails(). Create instance of Project Student and invoke all the methods in main.(Do the program without using constructors)

Ans=

Code-

Part1,

```
import java.util.Scanner;
class Student
{
        int rollno;
        String name;
        int age;
        int totalmark;

         void get()
        {
         Scanner P= new Scanner(System.in);
         System.out.print("Enter rollno : ");
         this.rollno =P.nextInt();
         P.nextLine();
         System.out.print("Enter name: ");
         this.name=P.nextLine();
         System.out.print("Enter age: ");
         this.age=P.nextInt();
         System.out.print("Enter totalmark: ");
         this.totalmark=P.nextInt();
        }
```

Part2,

```
          void disp()
         {
          System.out.println("Roll Number: " + this.rollno);
          System.out.println("Name : " + this.name);
          System.out.println("Age : " + this.age);
          System.out.println("Totalmark : " + totalmark);
         }

          String findGrades()
         {
          if(this.totalmark > 900)
                 {
                  return "Grade A";
                 }
         else if(this.totalmark > 700)
                 {
                  return "Grade B";
                 }
         else if(this.totalmark > 500)
                 {
                  return "Grade C";
                 }
             else
                 {
                  return "Failed";
                 }
         }
}
```

Part3,

```
class ProjectStudent
{
          int projid;
          String projtitle;
          String company;
          String projgrade;

          void getPDetails()
         {
          Scanner P1= new Scanner(System.in);
          System.out.println("Enter ProjectID: ");
          this.projid=P1.nextInt();
          P1.nextLine();
          System.out.println("Enter Poject title: ");
          this.projtitle=P1.nextLine();
          System.out.println("Enter Company: ");
          this.company=P1.nextLine();
          System.out.println("Enter Project Grade: ");
          this.projgrade=P1.nextLine();
         }

          void disPDetails()
         {
          System.out.println("Project ID: " + projid);
          System.out.println("Project Title: " + projtitle);
          System.out.println("Company: " + company);
          System.out.println("Project Grade: " + projgrade);
         }
}
```

```
class StdMain
{
        public static void main(String[] args)
        {
        Student s = new Student();
        s.get();
        System.out.println("Student Info: ");
        s.disp();
        String grade = s.findGrades();
        System.out.println("Grade: " + grade);

        ProjectStudent p = new ProjectStudent();
        p.getPDetails();
        System.out.println ("Project Info: ");
        p.disPDetails();
        }
}
```

Execution-

```
C:\Users\p7pha\OneDrive\Desktop\Cdac DBDA\JAVA\Day 5 & Lab5\Answer>javac StdMain.java

C:\Users\p7pha\OneDrive\Desktop\Cdac DBDA\JAVA\Day 5 & Lab5\Answer>java StdMain
Enter rollno :
1
Enter name: Sunil
Enter age: 35
Enter totalmark: 905
Student Info:
Roll Number: 1
Name : Sunil
Age : 35
Totalmark : 905
Grade: Grade A
Enter ProjectID:
101
Enter Poject title:
Windmill
Enter Company:
Suzlon
Enter Project Grade:
A
Project Info:
Project ID: 101
Project Title: Windmill
Company: Suzlon
Project Grade: A

C:\Users\p7pha\OneDrive\Desktop\Cdac DBDA\JAVA\Day 5 & Lab5\Answer>
```

2. Create a class named EmployeeSample having the following data members:

name

age

phoneno

address

salary

It also has a method named printSalary which prints the salary of the employee. Another class Manager inherits the Employee class. The Manager class have data member department. Now, assign name, age, phone number, address, salary and department to a manager by making an object of Manager class and print the salary.

Ans=

Code-

Part1,

```
import java.util.Scanner;

class EmployeeSample
{
        String name;
        int age;
        int phoneno;
        String address;
        int salary;

        void printSalary()
        {
         System.out.println("Salary: " + salary);
        }
}

class Manager extends EmployeeSample
{
        String department;

        Manager(String name, int age, int phoneno, String address, int salary, String
department)
        {
         this.name = name;
         this.age = age;
         this.phoneno = phoneno;
         this.address = address;
         this.salary = salary;
         this.department = department;
        }
}
```

Part2,

```
class Empmain
{
        public static void main(String[] args)
        {
         Scanner P= new Scanner(System.in);

        System.out.print("Enter Manager Name: ");
        String name=P.nextLine();

        System.out.print("Enter Manager Age: ");
        int age = P.nextInt();

        System.out.print("Enter Manager Phone No: ");
        int phoneno = P.nextInt();
        P.nextLine();

        System.out.print("Enter Manager Address: ");
        String address = P.nextLine();

        System.out.print("Enter Manager Salary: ");
        int salary = P.nextInt();
        P.nextLine();

        System.out.print("Enter Manager Department: ");
        String department = P.nextLine();

        Manager m = new Manager(name,age,phoneno,address,salary,department);

        System.out.println("Name: " + m.name);
        System.out.println("Age: " + m.age);
        System.out.println("Phone no: " + m.phoneno);
        System.out.println("Address: " + m.address);
        System.out.println("Salary: " + m.salary);
        System.out.println("Department: " + m.department);

        m.printSalary();
        }
}
```

Execution-

```
C:\Users\p7pha\OneDrive\Desktop\Cdac DBDA\JAVA\Day 5 & Lab5\Answer>javac Empmain.java

C:\Users\p7pha\OneDrive\Desktop\Cdac DBDA\JAVA\Day 5 & Lab5\Answer>java Empmain
Enter Manager Name: Rahul
Enter Manager Age: 27
Enter Manager Phone No: 1023456789
Enter Manager Address: Mumbai
Enter Manager Salary: 120000
Enter Manager Department: Finance
Name: Rahul
Age: 27
Phone no: 1023456789
Address: Mumbai
Salary: 120000
Department: Finance
Salary: 120000
```

3. Create a class A with the method dispmsg() which prints some message. Create one sub class of A with name B and override the dispmsg() function, also create one more subclass from B with name C and override the dispmsg() function in C also. In main invoke that function with the help of three class instances.

Ans=

Code-

Part1,

```
import java.util.Scanner;

class A
{
        void dispmsg()
        {
         System.out.println("Message from class A");
        }
}

class B extends A
{
        void dispmsg()
        {
         System.out.println("Message from class B");
        }
}

class C extends B
{
        void dispmsg()
        {
         System.out.println("Message from class C");
        }
}
```

Part2,

```
class ABCmain
{
        public static void main(String[] args)
        {
         Scanner P = new Scanner(System.in);

        A a = new A();
        B b = new B();
        C c = new C();

        System.out.println("Message A: ");
        a.dispmsg();

        System.out.println("Message B: ");
        b.dispmsg();

        System.out.println("Message C: ");
        c.dispmsg();
        }
}
```

Execution-

```
C:\Users\p7pha\OneDrive\Desktop\Cdac DBDA\JAVA\Day 5 & Lab5\Answer>javac ABCmain.java

C:\Users\p7pha\OneDrive\Desktop\Cdac DBDA\JAVA\Day 5 & Lab5\Answer>java ABCmain
Message A:
Message from class A
Message B:
Message from class B
Message C:
Message from class C
```

4. Create a class named Account with following members

I. Data Members

a. accNo

b. Name

c. accType

d. accBalance

II. Function members

a. Constructor to accept all values

b. deposit(int amt) accepting amount and add with the accBalance

c. withdraw(int amt) accepting amount to subtract from the accBalance

d. checkBalance() to return the present accBalance

Inherit classes such as SavingsAccount and PrivilegedAccount from the class Account. The rules of these account types are as follows:-

I. SavingsAccount

a. Deposit – can deposit upto a maximum of 50000 only in one transaction.

b. Withdraw – a minimum balance of 1000 should be there at any time.

II. PrivilegedAccount

a. Deposit – can deposit any amount

b. Withdraw – can take an overdraft of maximum 5000.ie, account balance go upto - 5000.

Write a main() function. Create objects of SavingsAccount and PrivilegedAccount, assign values to instance variables using constructor and invoke the methods.

Ans=

Code-

Part1,

```
class Account
{
        int accNo;
        String name;
        String accType;
        double accBalance;

        public Account(int accNo, String name, String accType, double accBalance)
        {
        this.accNo = accNo;
        this.name = name;
        this.accType = accType;
        this.accBalance = accBalance;
        }

        void deposit(double amt)
        {
        accBalance += amt;
        System.out.println(+ amt + " deposited successfully.");
        }

        void withdraw(double amt)
        {
        accBalance -= amt;
        System.out.println(+ amt + " withdrawn successfully.");
        }

        double checkBalance()
        {
         return accBalance;
        }
}
```

Part2,

```
class SavingsAccount extends Account
{
        public SavingsAccount(int accNo, String name, double accBalance)
        {
         super(accNo, name, "Savings", accBalance);
        }

        void deposit(double amt)
        {
        if (amt <= 50000)
        {
         super.deposit(amt);
        }
        else
        {
         System.out.println("Cannot deposite in Account");
        }
        }

        void withdraw(double amt)
        {
        if (accBalance - amt >= 1000)
        {
         super.withdraw(amt);
        }
        else
        {
         System.out.println("Minimum balance of 1000 should be maintained.");
        }
        }
}
```

Part3,

```
class PrivilegedAccount extends Account
{
         public PrivilegedAccount(int accNo, String name, double accBalance)
        {
         super(accNo, name, "Privileged", accBalance);
        }

        void withdraw(double amt)
        {
        if (accBalance - amt >= -5000)
        {
         super.withdraw(amt);
        }
        else
        {
         System.out.println("Cannot withdraw more than overdraft limit of 5000.");
        }
        }
}

class AccountMain
{
        public static void main(String[] args)
        {
         SavingsAccount s = new SavingsAccount(1, "Ramesh", 20000);
         PrivilegedAccount p = new PrivilegedAccount(2, "Suresh", 30000);

         s.deposit(30000);
         s.withdraw(55000);
         System.out.println("Savings Account Balance: " + s.checkBalance());

         p.deposit(20000);
         p.withdraw(55000);
         System.out.println("Privileged Account Balance: " + p.checkBalance());
        }
}
```

Execution-

```
C:\Users\p7pha\OneDrive\Desktop\Cdac DBDA\JAVA\Day 5 & Lab5\Answer>javac AccountMain.java

C:\Users\p7pha\OneDrive\Desktop\Cdac DBDA\JAVA\Day 5 & Lab5\Answer>java AccountMain
30000.0 deposited successfully.
Minimum balance of 1000 should be maintained.
Savings Account Balance: 50000.0
20000.0 deposited successfully.
55000.0 withdrawn successfully.
Privileged Account Balance: -5000.0

C:\Users\p7pha\OneDrive\Desktop\Cdac DBDA\JAVA\Day 5 & Lab5\Answer>
```

5. Write a class called Square with a method area(double a) that finds the area(a2) of the square. Create a class Cube which is a subclass of Square and write an overriding method area(double a) that finds the surface area (6a2) of the cube using super keyword. In the main function, invoke the function using the two class instances.

Ans=

Code-

```
class Square
{
         public double area(double a)
        {
         return a * a;
        }
}

class Cube extends Square
{
        public double area(double a)
        {
         double squareArea = super.area(a);
         return 6 * squareArea;
        }
}

public class SquareMain
{
        public static void main(String[] args)
        {
         double side = 4.0;

         Square s = new Square();
         double squareArea = s.area(side);
         System.out.println("Area of the square: " + squareArea);

         Cube c = new Cube();
         double cubeSurfaceArea = c.area(side);
         System.out.println("Surface area of the cube: " + cubeSurfaceArea);
        }
}
```

Execution-

```
C:\Users\p7pha\OneDrive\Desktop\Cdac DBDA\JAVA\Day 5 & Lab5\Answer>javac SquareMain.java

C:\Users\p7pha\OneDrive\Desktop\Cdac DBDA\JAVA\Day 5 & Lab5\Answer>java SquareMain
Area of the square: 16.0
Surface area of the cube: 96.0

C:\Users\p7pha\OneDrive\Desktop\Cdac DBDA\JAVA\Day 5 & Lab5\Answer>
```